REMARKS

Claims 1-3, 5, 8-13, and 15-17 are pending in the present application, claims 4, 6, 7, and 14 having been cancelled herein. The Office Action and cited references have been considered. Favorable reconsideration is respectfully requested.

The specification, abstract and claims were objected to due to minor informalities. These informalities have been corrected. No new matter has been added. Withdrawal of the objections is respectfully requested.

Claims 1, 4, 6, 10, 12 and 13 were rejected under 35 U.S.C. §112, second paragraph. The claims have been amended to overcome this rejection. Withdrawal of this rejection is respectfully requested.

Claims 1, 4, and 12-13 were rejected under 35 U.S.C. § 102(e) as being anticipated by Kim (U.S. Patent Application No. 2004/0259057). Claim 2 was rejected under 35 U.S.C. §103 as being unpatentable over Kim in view of Duret (WO 94/00074). Claim 3 was rejected under 35 U.S.C. §103 as being unpatentable over Kim in view of Boutoussov (U.S. Patent No. 7,461,982). Claims 5-6 and 14 were rejected under 35 U.S.C. §103 as being unpatentable over Kim in view of Geng (U.S. Patent No. 7,474,932). Claim 7 was rejected under 35 U.S.C. §103 as being unpatentable over Kim in view of Geng and Boutoussov. Claims 8 and 10 were rejected under 35 U.S.C. §103 as being unpatentable over Kim in view of Geng, Boutoussov and Mueller (U.S. Patent No. 6,086,366). Claim 9 was rejected under 35 U.S.C. §103 as being unpatentable over Kim in view of Gen, Boutoussov, Mueller, and De Jung (U.S. Patent Application No. 2002/0180953). Claim 11 was rejected under 35 U.S.C. §103 as being

unpatentable over Kim in view of Duret and Boutoussov. Claims 15-17 were rejected under 35 U.S.C. §103 as being unpatentable over Kim in view of Erdman (U.S. Patent No. 5,184,306). These rejections are respectfully traversed for the following reasons.

Claim 1 has been amended, and now comprises:

1. the subject matter of original claim 1;

2. the wording *"wherein said acquiring steps comprise the emission of electromagnetic radiation"* supported by original claims 2 and 3;

3. original claim 7, worded in an improved way;

4. original claims 6 and 14; and

5. part of the original claim 8 worded in an improved way.

Moreover, claims 4, 6, 7 and 14 have been cancelled and the dependencies between the claims have been fully revised so as to make consistent each other the features recited in the various claims.

KIM provides a medical simulation apparatus which is capable of performing a simulation of a surgical operation, in particular a surgical orthodontic operation, by correlating a three-dimensional image on a display (5) with an actual model (6) of the operation zone, in particular with an entity model (6) of the upper dental arch (61) and of the lower dental arch (62) of a patient. To this purpose, three reference marks (MKI, MK2, MK3) are provided on a surface of the upper dental arch (61) of the entity model (6), in order to define a coordinate system, and three measurement marks (MP1, MP2, MP3) are provided on a surface of the lower dental arch (62) of the same model (6). Then, the coordinates of these three measurement marks (MP1, MP2, MP3), with respect to the coordinate system defined by the three reference marks

(MK1, MK2, MK3), are acquired by a three-dimensional measuring instrument (7) of the simulation apparatus, before and after displacement of the lower dental arch (62). The coordinates thus obtained are converted into coordinates in another coordinate system, which is defined by further three reference marks (pKl, PK2, PK3), in turn set in the three-dimensional image displayed on the display (5) and corresponding to the three reference marks (MK1, MK2, MK3) provided on the entity model (6). In this way, the simulation apparatus determines the changes of the coordinates after displacement of the lower dental arch (62) of the entity model (6), and causes a region, preliminarily specified in the three-dimensional image displayed on the display (5), to change according to the changes of the entity model, *i.e.*, to the displacement of the lower dental arch (62).

However, Applicant respectfully submits that KIM fails to provide at least the following features, now recited in amended claim 1: "....acquiring the position of at least one second reference surface, which is associated with a handpiece of the tool type operated by a health operator inside the mouth of a patient...."

In fact, the simulation apparatus disclosed by KIM appears to be limited, in order to generate the three-dimensional image to be displayed on the display (5), to acquire dimensional data and information which concern only the effective configuration of a patient's dental zone, but not that of other parts, as for instance tools or similar objects usable by a dentist for operating on this dental zone. Accordingly, the displayed three-dimensional image taught by KIM, intended for simulation purposes and for aiding the dentist in his work, appears to be limited to represent only the dental zone and no

other parts or objects, as in particular a handpiece of the tool type, usable by the dentist for operating on it.

Moreover, the operation of this known apparatus is based on the provision of an additional material model (6) of the dental site, from which model the apparatus acquires the relevant dimensional data and information for generating the three-dimensional image simulating the zone of the dental site. In contrast, in the method of the present invention, all the relevant dimensional data and information are acquired directly from the zone of the dental site, in order to generate the three-dimensional image simulating it.

Briefly, KIM is totally silent on providing and/or merely suggesting a step for acquiring the shape and the dimensions of a handpiece, usable by a dentist while operating on a dental site and specifically of the tool type, in order to generate a three-dimensional image, displayed on a display, suitable for representing and simulating the zone of the dental site together with the effective operative conditions encountered by the dentist while operating on it by using this handpiece of the tool type.

For at least these reasons, Applicant respectfully submits that KIM does not anticipate claim 1. Claims 4 and 12-13 are believed to be patentable in and of themselves, and for the reasons discussed above with respect to claim 1.

The other cited art, GENG, BOUTOUSSOV, and MUELLER do not remedy the deficiencies noted above with respect to claim 1. GENG discloses a CAD software for design a prosthesis wherein image data representative of the patient's dentition are acquired by a camera (104). However, GENG is totally silent on disclosing or suggesting the use of CAD software that uses a generated three dimensional image

of the relative position of a handpiece of the tool type with respect to a portion of the upper or lower dental arch of a patient for the assisted preparation of an application site for the installation of a prosthesis.

Specifically, the CAD software disclosed by GENG fails to provide at least the following features, now recited in amended claim 1:

- acquiring the position of at least one first reference surface, which is associated with at least one portion of either the upper dental arch or the lower dental arch of a patient;

- acquiring the position of at least one second reference surface, which is associated with at least a handpiece of the tool type operated by a health operator inside the mouth of the patient;

- processing, by said processing unit, the transmitted signals in order to generate a three dimensional image of the relative position of said handpiece with respect to said portion, displaying said image on a screen;

- comparing said relative position with predefined limit reference positions stored in said electronic processing unit and indicating any straying of said relative position beyond said limit reference position, whereby said three-dimensional image of the relative position of said handpiece with respect to said portion is usable for the assisted preparation of said application site in said portion; and

- the use in the acquiring steps of electromagnetic radiations.

BOUTOUSSOV discloses an illumination device containing optical fibers that transmit light from a source to a target. The illumination device comprises also additional optical fibers that return reflected electromagnetic energy from the target for

further analysis. However, also BOUTOSSOV is totally silent on disclosing or suggesting the use of a generated three dimensional image of the relative position of an handpiece of the tool type with respect to a portion of the upper or lower dental arch of a patient for the assisted preparation of an application site for the installation of a prosthesis.

MUELLER discloses a device for removing material such as tooth enamel or dentline from a tooth. The device comprises also distance measurement device to monitor the depth of material removal, while the material is being removed. The device disclosed by MUELLER only measures the depth of material removal and the measurement device is usable exclusively while the material is being removed. However, MUELLER is also totally silent on disclosing or suggesting the use of a generated three dimensional image of the relative position of the device with respect to a portion of the upper or lower dental arch of a patient for the assisted preparation of an application site for the installation of a prosthesis.

Thus, neither of these references, whether taken alone or in combination as proposed in the Office Action, teaches all of the elements claimed in claim 1. For at least these reasons, Applicant respectfully submits that claims 1-3, 5, 8-13, and 15-17 are patentable over the prior art of record whether taken alone or in combination as proposed in the Office Action.

In view of the above amendment and remarks, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections of record. Applicant submits that the application is in condition for allowance and early notice to this effect is most earnestly solicited.

If the Examiner has any questions, he is invited to contact the undersigned at 202-628-5197.

Respectfully submitted,

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